MED & Italian Energy Report

Presentation of the 6th edition

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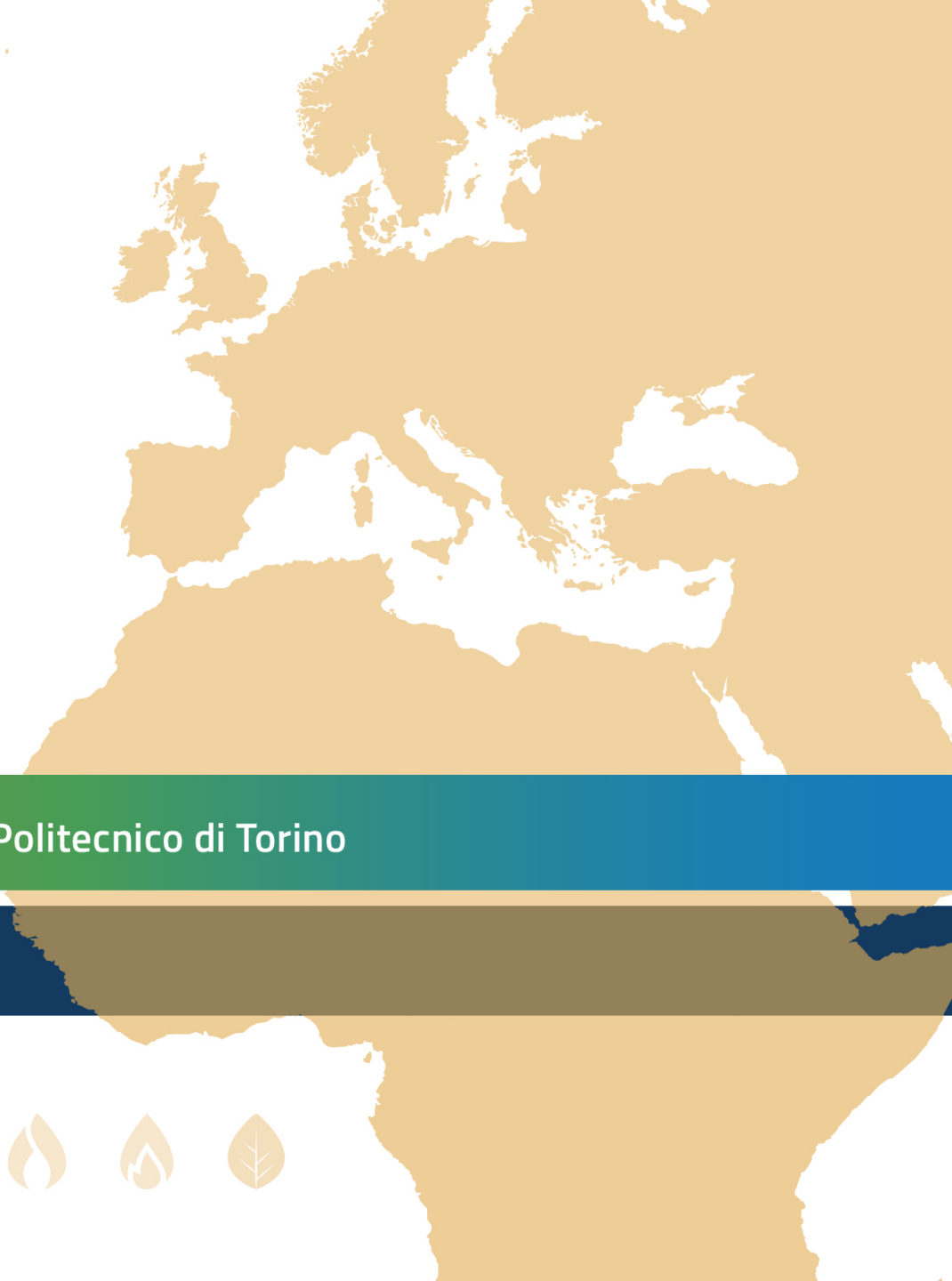
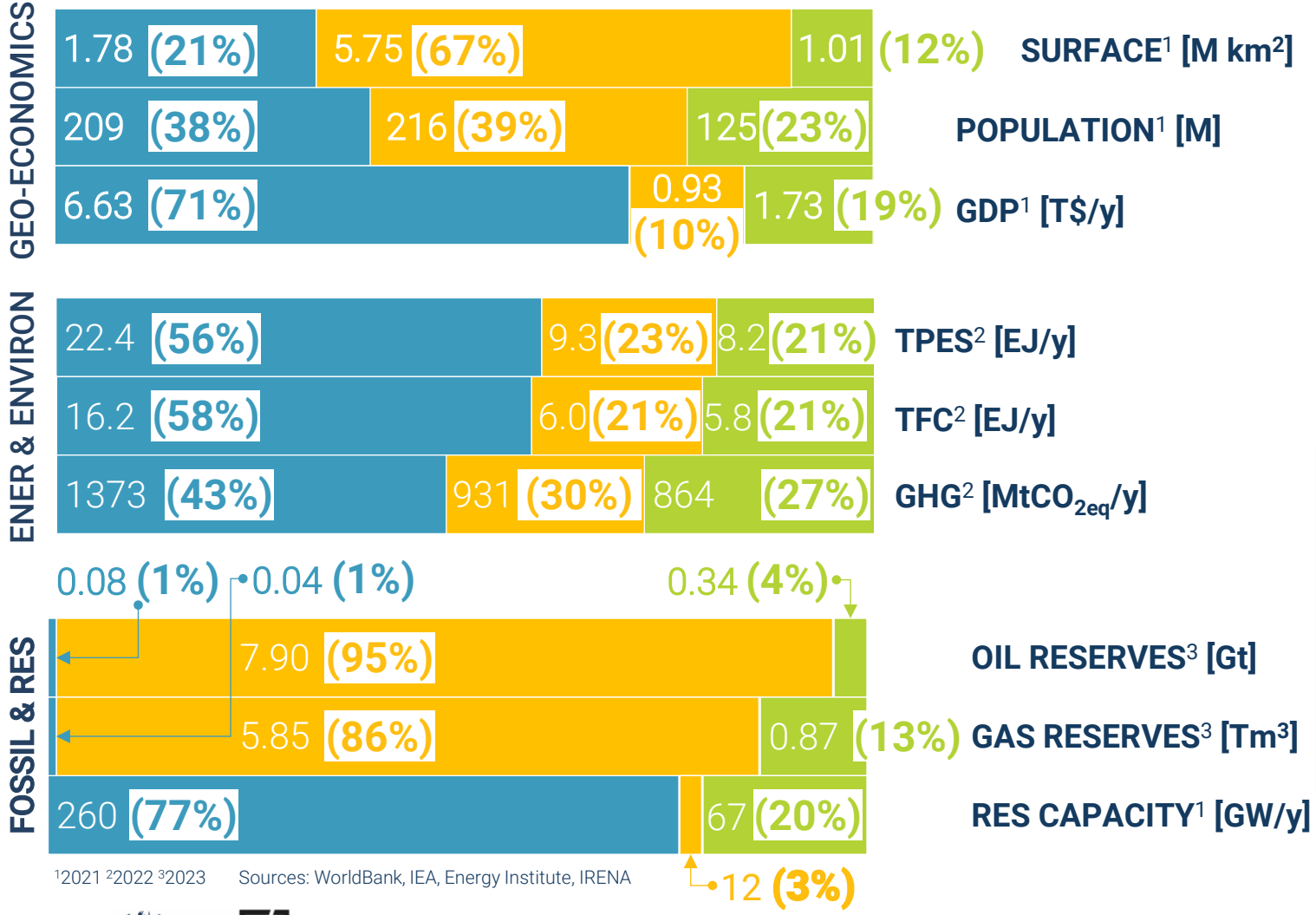


The Mediterranean Basin at a glance



[1]2021 [2]2022 [3]2023 Sources: WorldBank, IEA, Energy Institute, IRENA

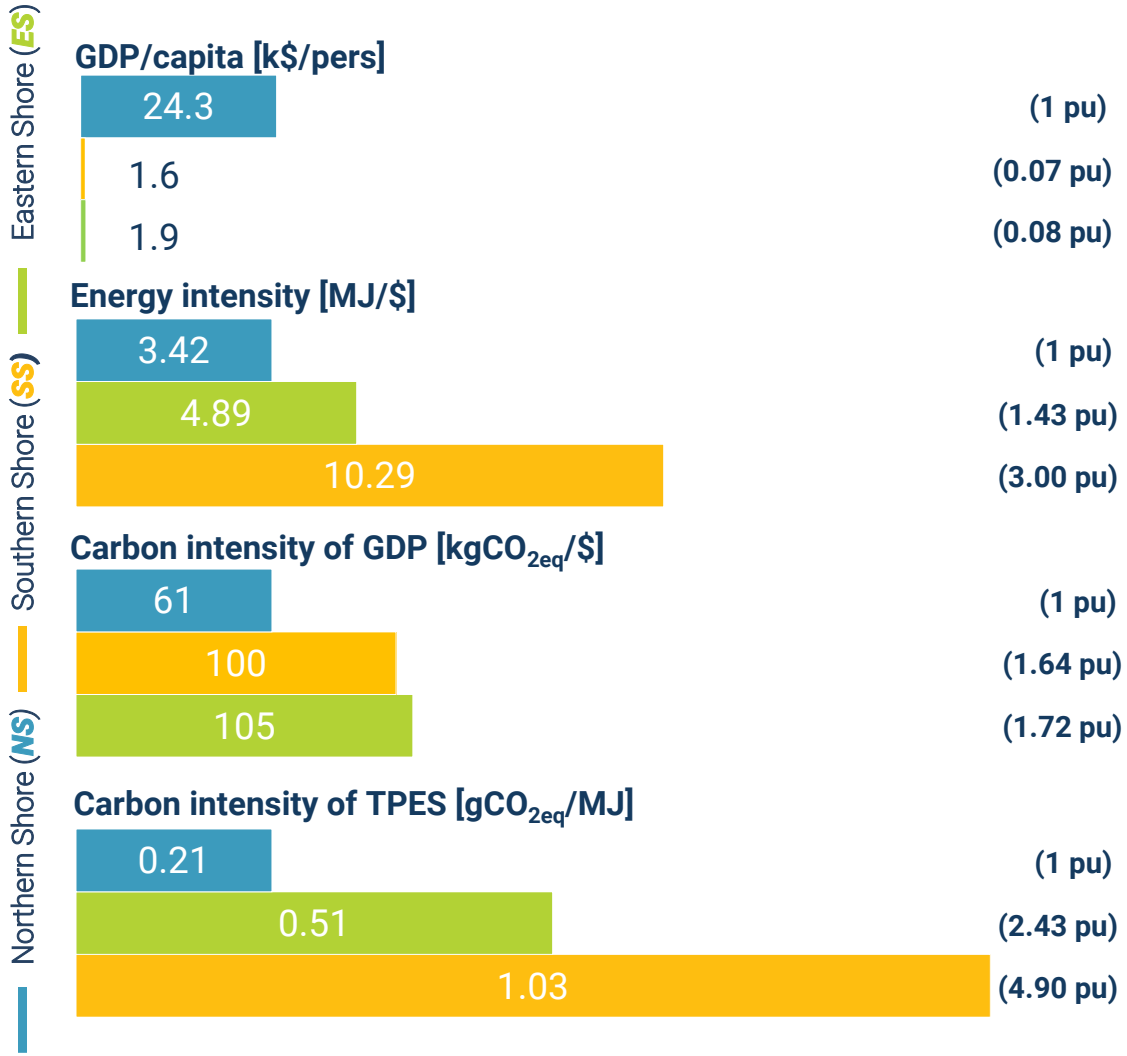
- ***SS*** Surface → **2x** (***NS***+***ES***)
- ***NS*** and ***SS*** Population → **40%**
- ***NS*** GDP → **70%**
- ***NS*** TPES and TFC → **60%**
- ***NS*** GHG→ **40 %** ***SS*** GHG → **30 %**
- ***SS*** Crude & Gas reserves → **>85 %**
- ***NS*** RES Capacity → **>75 %**

SS largest area but **same population** as ***NS***, with **low GDP**, **low energy consumption** and vaste **fossil resources**

NS **small area** with **same population** as ***SS*** and **high GDP**, **high energy consumption**, high **RES exploitation**

NS: Albania, Bosnia-Herzegovina, Croatia, France, Greece, Italy, Malta, Montenegro, Portugal, Slovenia, Spain
SS: Algeria, Egypt, Libya, Morocco, Tunisia
ES: Cyprus, Israel, Lebanon, Syria, Turkiye

The environmental/energy/economic «ratios» in the Mediterranean



- GDP ***SS*** and ***ES*** GDP → **0,07 x** of ***NS***
- ***SS*** Energy intensity → **3 x *NS***
- ***ES*** Energy intensity → **1,5 x *NS***
- ***SS*** and ***ES*** Carbon intensity of GDP → **1.7x *NS***
- ***SS*** Carbon intensity of TPES→ **5 x *NS***
- ***ES*** Carbon intensity of TES → **2,5 x *NS***

NS largest **GHG emitter** and **energy consumer**, but **more efficient** (energy intensity) and **decarbonized** economy (carbon intensity) and energy system
→ ***SS*** and ***ES*** higher **environmental impact** in terms of **economy** and **emissions** of their energy systems

Sources: WorldBank, IEA, Energy Institute, IRENA

Energy and financial flows in the Mediterranean: Black Dialogue

Black Dialogue

- Fossil resources abundant in ***SS*** (**95%** crude, **86%** gas)[1]: ***SS*** → ***NS*** **energy flow** (**2.78 TJ/y**)
- NS has few fossil resources and imports (also) from ***SS***: ***NS*** → ***SS*** **financial flow** (**32.9 b$/y**)[1]
- Fossil economy crucial for ***SS*** rentier states
  - **Algeria:** *oil/gas rents*[1]: **(14.5%/8.0%)** of GDP, *weight of oil/gas on exports*[1]: **(30%/40%)**, *subsidies*[2]: **10.9%** of GDP
  - **Egypt:** *oil/gas rents*[1] : **(3.0%/2.0%)** of GDP, *weight of oil/gas exports*[1]: **(8%/7%)**, subsidies[2]: **7.4%** of GDP
  - **Libya:** *oil/gas rents*[1] : **(56.4%/4.6%)** of GDP, *weight of oil/gas exports*[1] : **(88%/6%)**, subsidies[2]: **17.9%** of GDP
- ***NS*** and ***SS*** **intertwined**: ***NS*** needs ***SS*** for **security** of supply – ***SS*** needs ***NS*** for **economic welfare**
- In 2023: weight of Algeria over ***NS*** /**Italy** gas imports: **(21%/36%)**. Share of Algerian total exports to EU27 delivered to ***NS*** /**Italy**: **(98%/56%)**
- Med as **landing basin** of fossil commodities: **63%** of oil[2] and **37%** of gas[2] extra-Med imports to the EU27 was delivered to ***NS*** countries

[1]2021 [2]2023; Sources: WorldBank,, Energy Institute, IRENA, OEC, MASE, European Commission, Med-TSO, Eurostat, Snam, Egypt Energy, Ministère de l'Industrie, des Mines et de l'Energie (Tunisie)

Energy and financial flows in the Mediterranean: Green Dialogue ?

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Green Dialogue

- Energy transition and economy greening in ***NS*** (**Green Deal**) → **1 trillion €** in decade 2020-2030 to achieve 55% emissions reduction, 2030 RES target in ***NS***: **482 GW**.
- ***SS***: **energy transition** and **economy greening** hardly prioritized by national governments (**fossil lock-in**) → only **12 GW** (2023) of RES (2030: **94 GW**).
- Obstacles in ***SS***: lack of a **consolidated regulatory framework**, **political instabilities** and **market barriers** for **private investments** in RES.
- Estimated investments in ***SS***: **Egypt: 640 G$** → sustainable economic growth & 42% RES by 2030, **Morocco 53 G$** → decarbonise economy by 2050 , **Tunisia 17 G$** → reduce CO_2 emissions from energy of 46% wrt 2021 by 2035.
- New electricity **interconnections** for the transition: from ***SS*** to ***NS*** (**8,300 MW**) , from ***SS*** to ***ES*** (**5,000 MW**).
- **Multicommodity** energy system → Snam: **20 M€** and **227 M€** in **2023-2027** to engineer **South$_2$ Corridor** and expand the **biomethane** produciton capacity, respectively.

Sources: WorldBank,, Energy Institute, IRENA, OEC, MASE, European Commission, Med-TSO, Eurostat, Snam, Egypt SIS, Ministère de l'Industrie, des Mines et de l'Energie (Tunisie)

The Southern Shore as a natural gas exporting partner

Importing Country	Total Imports [Gm³/y]	SS Imports [Gm³/y]	SS Weight
France	45.98	4.45	9.6%
Greece	4.82	0.62	12.9%
Italy	61.82	28.48	46.1%
Slovenia	0.81	0.23	28.3%
Spain	35.26	10.74	30.5%
Türkiye	50.48	7.31	14.5%
Total	**206.97**	**51.82**	**25.0%**

- In 2023, ***SS*** **gas exports** weighted **25%** (**51.8 Gm³/y**) of NS and ES imports (Algeria alone → **22.5%**).
- **Italy** depended on the ***SS*** for **41.3%** (**26.0 Gm³/y**) (Algeria alone → **35.8%**). ***SS*** exports to **Spain** → **35.3%** of the total (**10.7 Gm³/y**).
- The need to replace **phase-out Russian gas** supplies urged countries of the ***NS*** to increase the share of **LNG** in their import mixes.

Sources: Eurostat, AXSMarine

The rising role of LNG for the Mediterranean

Country	Operational Capacity [Gm³/y]	Planned Capacity [Gm³/y]
Croatia	2.8	0.0
Cyprus	0.0	**0.8**
France	36.9	**2.6**
Greece	11.7	0.0
Israel	3.9	0.0
Italy	20.3	**4.8**
Malta	0.4	0.0
Portugal	7.5	0.0
Spain	64.7	0.0
Türkiye	40.2	0.0
Total	**188.4**	**8.2**

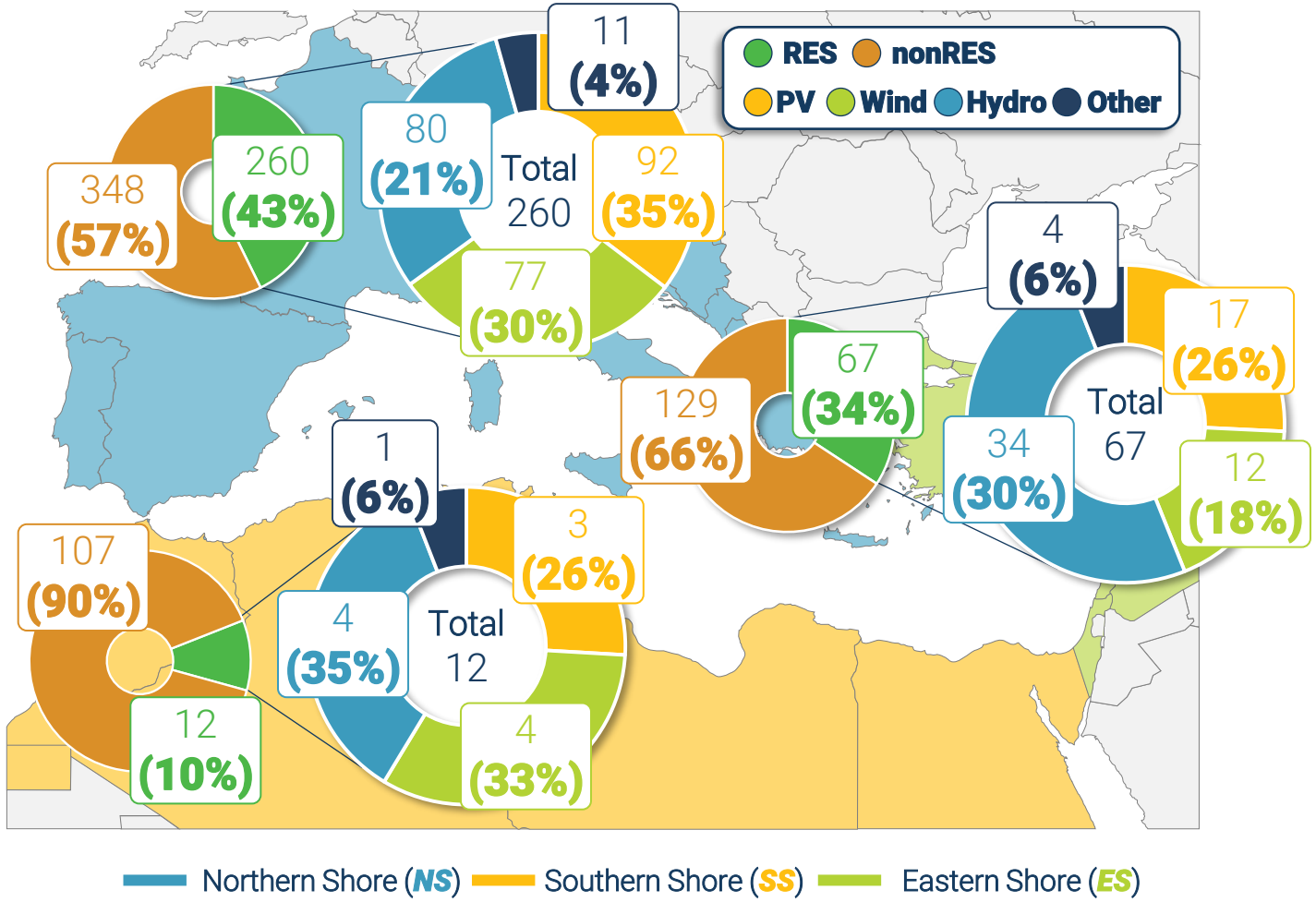
- Total imports: **67.5 Gm³/y** (2021) → **92.4 Gm³/y** (2023).
- Imports from **USA**: **18.1 Gm³/y** in 2021 → **32.8 Gm³/y** in 2023.
- Import from **Algeria** always **> 11.0 Gm³/y** in 2013-2024
- Impacts of Russo-Ukrainian crisis
  → Between 2023 and 2024: **35.2 Gm³/y** of new regasification capacity (**Italy**, **France**, **Spain**, **Greece** and **Türkiye**)
  → By 2026: further **8.2 Gm³/y** (**Italy**, **France** and **Cyprus**)

LNG usually more expensive than pipeline gas and subject to disruptions to opensea corridors, regardless of the origin country.

Sources: Eurostat, AXSMarine, IGU

RES in the Mediterranean Basin

2023 Share of RES installed capacity (in GW) RES by source and by shore

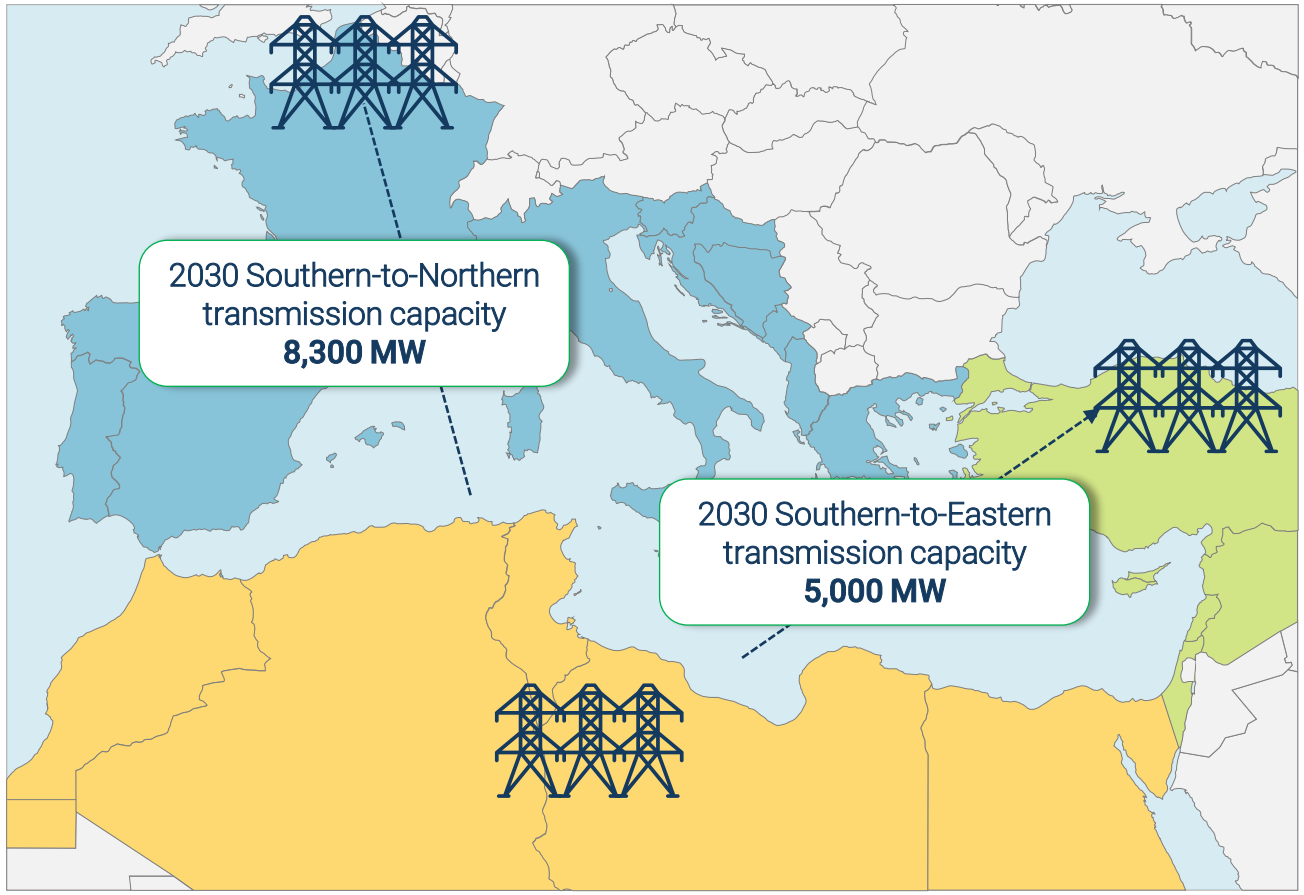


- RES resources in ***SS***
  → **solar irradiance** (287 kWh/m², ***NS***: 0.72 times, ***ES***: 0.85 times)
  → **wind speed** (3.66 m/s*, NS: 0.68 times, ES: 0.67 times)
- RES in Med → **>80%** of PV and wind capacity only **in Italy**, **Spain**, **France**, and **Türkiye**. ***SS*** → **3.5% (12 GW)**
- **Electricty generation from RES** (2022)**: Spain** and **Türkiye** → **42%** each, **Italy** → **35%**.
- Offshore Wind ***NS*** (and MED) → **904 MW**, **842 MW** of which in **France**.

* 10 m height

Sources: ENEMED-Plat, IRENA, WindEurope

(Electricity) green corridors form SS to NS



- **Energy transition** → main role of **electricity** → dpenetration of solar **PV** and **wind turbines**.
- **SS RES potential**: **< 1%** of surface to match future electricity **demand** and export **surplus electricity** to the other two shores.
- **Diffusion of RES** → **strengthen** current trans-Mediterranean power **transmission network**.
- New interconnections (2030): **8,300 MW *SS*** → ***NS***; **5,000 MW *SS*** → ***ES***
  → carry **4%** of ***NS***+***ES*** electricity demand in 2030.

Sources: ENEMED-Plat, Enemed23

Energy impacts of the Red Sea geopolitical tensions

Beginning of Houthi attacks: 19th October 2023

NS **imports of crude oil and LNG through the Red Sea in 2019-2024***

	2019	2020	2021	2022	2023	2024	Δ24-19
Crude Oil [Mt/y]	27.4	16.6	17.4	20.0	30.9	8.8	**-67%**
LNG [Gm³/y]	13.9	12.2	10.7	11.7	10.7	0.66	**-95%**

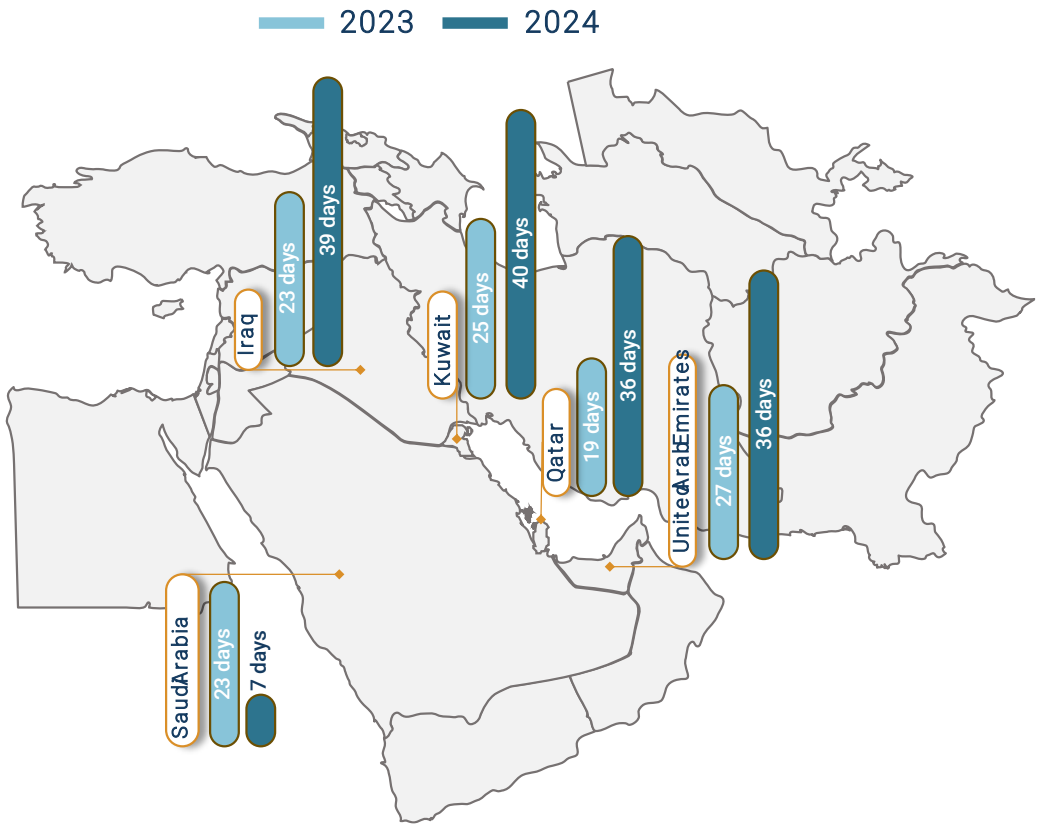
- Since attacks: ships **round Cape of Good Hope** and enter the Mediterranean Basin from the **Gibraltar Strait**

  → Average **voyage duration** from Persian Gulf to Med: from **20-25 days** to **40-45 days**.

  → **Costs**: additional **insurance fees** on Red Sea routes, fuel costs **> 2x**, economic losses for **Egypt** (**7 b$** in 2024).

*01/01/2024-30/11/2024

Average voyage duration of ships delivering crude oil and LNG Mediterranean countries



Sources: AXSMarine, Reuters, NBC, CNN

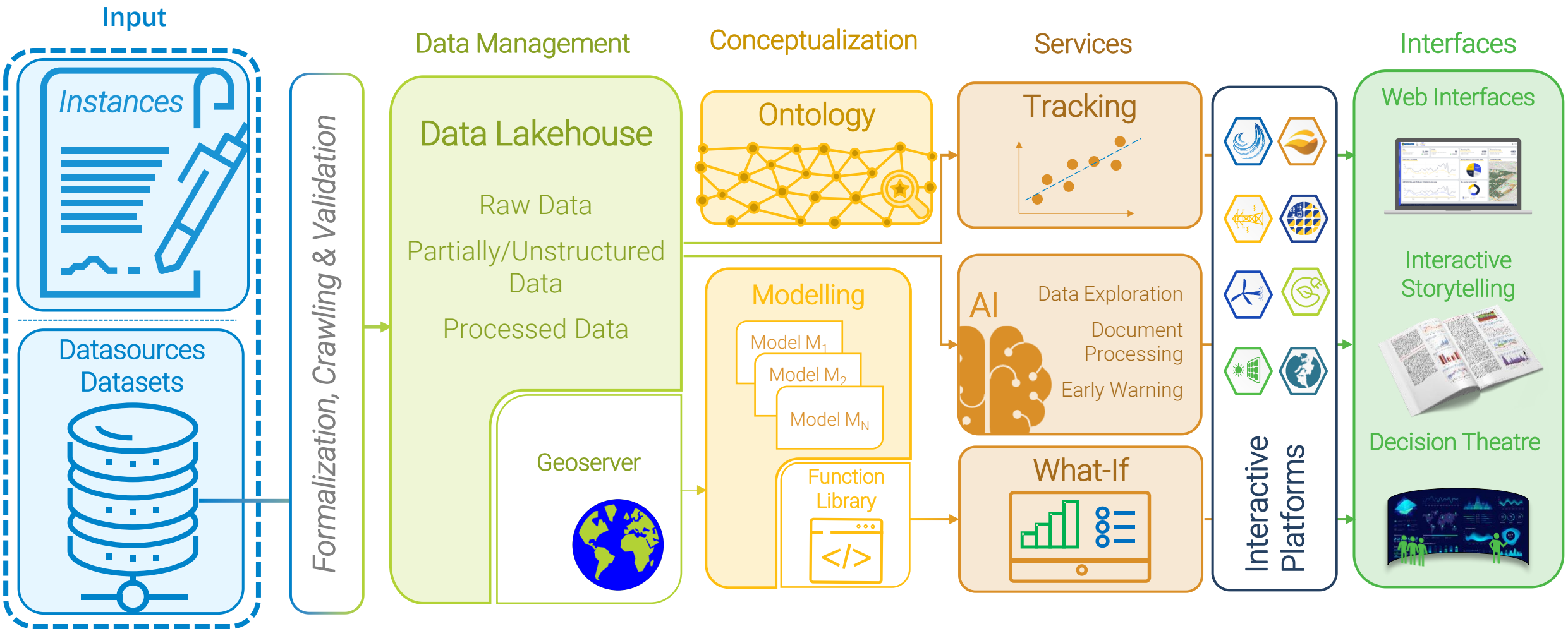
Science-based support to policy decision-making

- **Science** does not simply mean technology, rather than an approach to **understand our complex world** and its **dynamics**.
- The staples of science-based support are ① **data** (**automatically** updated) ② **libraries of functions** implementing mathematical models ③ **user-friendly interfaces** decision-makers can interact with.
- The science-based adopts two main operative approaches:
  - **what-if** (in-silico analyses) → selection among different options
  - **Key Performance Indicators (KPIs) → track the evolution** of the system and its **new statuses,** defining **quantitative objectives**
- Policy decision-makers in the energy field need to take decisions balancing **environmental sustainability, energy security and equity/affordability**, and the undertaken actions can be consistent but also conflicting w.r.t these goals.

The dynamic think-tanking approach for science-based support to policy decision maing

- In our **rapidly changing** world, effective science-based support to policy decision-making needs to **automate data collection and processing** to transform them into **useful information**.
- In this framework, **dynamic think-tanking** sets a dialogue between the decision-maker and the data and models, allowing the decision-makers themselves for an **easy and interactive exploration** of data and for “in silico” testing of possible **alternative policy scenarios**.
- A **dynamic think tank** is a collection of knowledge, usually multi-disciplinary, mathematical models and data tracking systems that, integrated in **advanced IT tools**, gives the policy decision-makers the possibility, to a certain extent, to get **customized answers** to their questions, **almost in real time**.
- Dynamic think-tanking is structurally based on the development and the adoption of **innovative and interactive IT tools**. A key example of these tools is represented by **web-platforms**.

The process flow for dynamic science-based support to policy making



Thank you for your attention